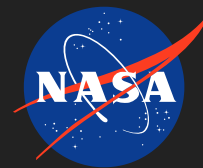


## Compact 2 Micron Seed Laser, Phase II

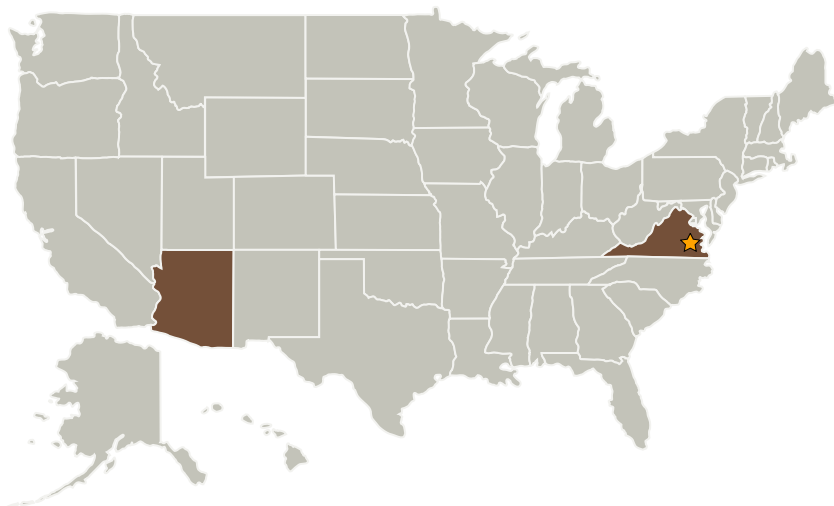
Completed Technology Project (2005 - 2007)



## Project Introduction

This proposal is for the development of innovative compact, high power and extremely reliable 2 micron seed laser using newly developed Tm3+ doped germanate glass fibers, which exhibit high quantum efficiency. This type of fiber based seed laser is needed for constructing high energy pulsed 2 micron Ho-doped crystal lasers for LIDAR applications. The single frequency fiber laser, which will be developed as part of the seed laser, is needed for building coherent laser Radar for space exploration program. We propose to use highly Tm3+ doped germanate glass fibers with high gain per unit length to form a short linear cavity to generate single frequency fiber laser operation. Germanate glass exhibits lower phonon energy compared to silica glass, increasing the quantum efficiency of 3F4 level of Tm3+ ions. Importantly, Tm3+ can be highly doped into germanate glasses, which results in so called cross-relaxation, dramatically improving the gain per unit length and the quantum efficiency. The single frequency fiber laser will be used to construct seed lasers by integrating with controlling electronics.

## Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
NP Photonics, Inc.	Supporting Organization	Industry	Tucson, Arizona



Compact 2 Micron Seed Laser, Phase II

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## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Center / Facility:**

Langley Research Center (LaRC)

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Compact 2 Micron Seed Laser, Phase II

Completed Technology Project (2005 - 2007)



### Primary U.S. Work Locations

Arizona

Virginia

### Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

### Technology Areas

**Primary:**

- TX08 Sensors and Instruments
  - └ TX08.1 Remote Sensing Instruments/Sensors
  - └ TX08.1.5 Lasers